

Revolutionary Performance For Ultra Low Reynolds Number Vehicles, Phase II

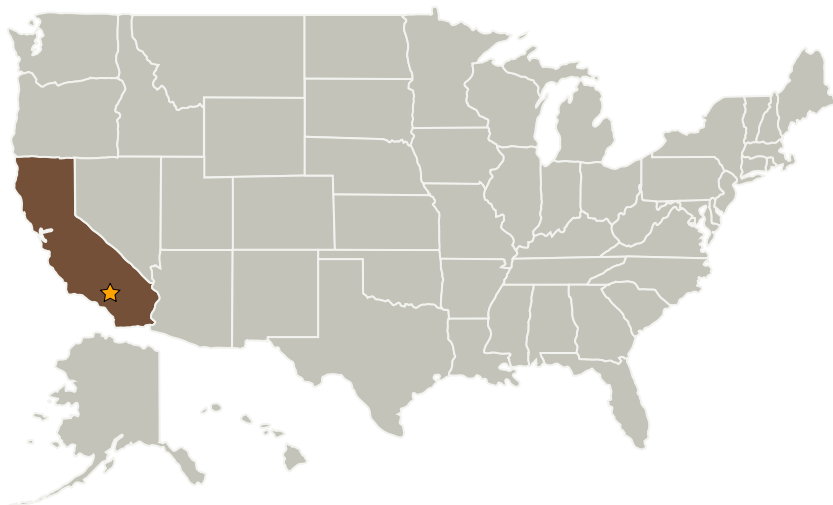
Completed Technology Project (2006 - 2008)



Project Introduction

A novel technique for controlling transition from laminar to turbulent flow in very low Reynolds number conditions has been developed. Normally flows with Reynolds numbers in the range of 20,000 to 120,000 are dominated by laminar separation bubbles and are difficult to transition without using very large traditional trip devices, such as distributed roughness. Additionally, these traditional trips are sized for one flow condition and are either not effective at off-design conditions or create a large device drag penalty. RHRC's innovative transition control technology is capable of transitioning flow across a wide range of low Reynolds number conditions without resizing or incurring an off-design performance penalty. The system also produces minimal device drag. The novel transition control technology was shown to reduce trip drag penalties by as much as 35% to 60% when compared to correctly sized traditional trips, and increasing to as much as 190% at off-design conditions. In addition, the system can be implemented without external power. The commercialization potential for the technology is extremely promising, with applications such as micro unmanned air vehicles, high-altitude long-endurance aircraft, Mars exploratory flyers, and propeller systems.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission
Directorate (STMD)

Lead Center / Facility:

Armstrong Flight Research
Center (AFRC)

Responsible Program:

Small Business Innovation
Research/Small Business Tech
Transfer

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Organizations Performing Work	Role	Type	Location
★Armstrong Flight Research Center(AFRC)	Lead Organization	NASA Center	Edwards, California
Rolling Hills Research Corporation	Supporting Organization	Industry	El Segundo, California

Primary U.S. Work Locations

California

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX01 Propulsion Systems
 - └ TX01.3 Aero Propulsion
 - └ TX01.3.2 Turbine Based Combined Cycle